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CONTAGIOUS ABORTION OF CATTLE
AND
THE UTERINE DOUCHE TREATMENT

BY
W. H. RIDGE, V. M. D.

STATE LIVESTOCK SANITARY BOARD

Compiled by
W. S. GIMPER, V. M. D.

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HARRISBURG, PENNA.:
1919

Harrisburg, January 1, 1919.

Hon. Charles E. Patton,
Secretary of Agriculture,
Harrisburg, Pa.

Dear Mr. Secretary:—

The attached manuscript relates to the animal disease commonly known as Contagious Abortion and the impairment of generative function of the female which may inhibit pregnancy or induce premature parturition.

A female in which this physical condition persists is commonly termed "sterile," although the term is relative rather than absolute and is used in this article in its relative sense.

The material for this article was compiled chiefly from field experiences of Board agents. It is intended primarily as a guide to the practicing veterinarian in applying the uterine douche treatment, which is a comparatively new development in veterinary science. Attention is also given to certain phases of the subject which may be interesting and profitable to dairymen and breeders.

I, therefore, recommend that it be published as a bulletin of the Department of Agriculture and distributed to persons interested in the several branches of livestock husbandry.

Respectfully yours,

T. E. MUNCE,
Acting State Veterinarian.

CONTAGIOUS ABORTION OF CATTLE AND UTERINE DOUCHE TREATMENT.

Contagious abortion, also called infectious abortion, enzootic abortion, abortion disease and Bang's disease, was regarded as contagious as early as 1800, but not until 1876 did Franck prove its contagious nature. The causative organism, B. arbortus, Bang, was isolated from cattle by Bang in 1896. It occurs most frequently in cattle but may affect horses, sheep and swine.

The disease in cattle with its frequent sequela sterility, has assumed an economic importance comparable to that of bovine tuberculosis. Owing to the absence of reliable data, it is not possible to estimate with any degree of accuracy the great losses occasioned by this disease. The death of calves in the early fetal stages and the impaired health of those born near full term with the subsequent unthriftiness of the dams; and the suspension of generative function or permanent sterility of some aborting cows are the principal causes of money and bloodline losses. In the cases of valuable breeding animals or high producing cows, the losses from these causes are severe and discouraging. Formerly it was confined principally to dairy cattle, but in the past few years it has spread to beef herds on ranges in this country.

It is not uncommon to find abortion and sterility resulting from causes other than the abortion bacillus of Bang, but the percentage of such cases in relatively small and of lesser economic importance.

The importance of abortion as a specific disease, and one which could be prevented, was not realized until quite recent years. Its continued rapid spread will soon make it the most serious economic disease of cattle.

A form of abortion, infectious and contagious in character, has been known in Pennsylvania for a number of years. The Laboratory of the State Livestock Sanitary Board made a study of the disease and found, in 1901, that it was similar to the European abortion disease and caused by the same organism as isolated and described by Bang in 1896. During succeeding years investigations and experimental work have been conducted by the field and laboratory personnel of the State Livestock Sanitary Board to determine the modes of infection and devise the best means for combating the disease. It was found that closely stabled and highly bred cattle appear more susceptible to infection. After the infection gains entrance to the herd, it spreads rapidly unless proper measures are taken to control it. The infection may persist for years where no preventive measures are adopted. Aborting cows are capable of transmitting the infection after they have ceased to abort and are thus a source of danger which must be considered.

About three years ago the State Livestock Sanitary Board determined upon the use of the uterine douche in conjunction with strict sanitation as the best means of eradicating the disease from individual herds and restoring presumedly sterile cows to usefulness in dairying and breeding.

With this end in view, the co-operation of several herd owners was secured and a veterinary agent of the Board with extensive experience in cattle practice was placed in charge of the work. The plan adopted was to treat the selected herds in the presence of local veterinarians in order that they should become thoroughly competent to use the douche treatment in their fields of practice. In this way the work would broaden to reach all parts of the State and the approved treatment would become a routine of ethical practice.

The operation of douching the uterus, while somewhat spectacular is neither dangerous nor painful, but requires a full knowledge of the anatomy of the genitals and much care combined with skill in certain cases.

The herd owners were also fully advised of the modus operandi and asked to assist with the actual work in order that they should become familiar with the physical and clinical manifestations of the disease and thus be able to make an early diagnosis.

At first the treatment was limited to actual aborters, but it was soon determined that it could be profitably used on presumedly sterile cows. A phenomenon that was noticed in cases where aborters were treated soon after the abortion occurred, was an increase in the milk secretion. Later experience proves this to be a constant factor.

STERILITY.

In a general way, any cow which repeatedly fails to produce offspring is regarded as a sterile subject. Our experience with the uterine douche treatment proves this to be a fallacy and leads to the belief that many good cows have been unnecessarily sacrified to the butcher. Sterlity is not a disease, but a physical condition which may be due to any one or more of numerous causes, such as: Age, congenital defects, cystic or other degenerations of the ovaries, retained corpus luteum, edema of the ovaries, inflammatory attachment of the ovaries, salpingitis, stenosis of the cervix, occlusion of the os, inspissated pus in the cervidal canal, granular veneral disease, pyometra, metritis, nymphomania, overfeeding, freemartins, hybrids and various constitutional diseases. Neglect to breed a cow for a long period after parturition may induce temporary sterility. This has been noted when cows are under test for advanced registry. Potency of the male should be tested.

In treating a large herd we look upon the cows which are sterile from contagious abortion as being responsive to treatment with excellent chances for complete recovery. Some cases that are temporarily sterile from other causes may be restored and should be treated according to the diagnosis of cause.

The subject of persistent corpora lutea has received much study. There are two thories upon which treatment is advanced: Hess recommends rupturing cysts and pressing out corpora lutea, contending that this will cause the uterus to regain its normal condition. That in case of pyometra, after the lutea have been forcibly expelled from the ovaries, the uterus will contract and expel the pus.

Albrechtsen holds that the ovarian condition is secondary and the uterus should be treated by douche and massage, expelling the effete material, after which the corpora lutea will be absorbed and the ovaries resume their functions. The cow is then bred, if she conceives, the uterus seal itself by a gelatinous plug in the cervix and gestation continues to full term.

We have been following the Albrechtsen method for two years with good results and little danger of injury to the patient.

INSTRUMENTS USED.

1. 20″ Knowles uterine forceps.
1. 15″ Knowles uterine forceps.
1. ¼″ Ridge uterine catheter, 12″ long.
1. ⅜″ Ridge uterine catheter, 12″ long.
1. ½″ Ridge uterine catheter, 12″ long.
1. ⅝″ Ridge uterine catheter, 20″ long—rarely needed.
1. Bozenwin's curved medium dressing forceps.
1. 1-gallon douche bag and tube.
1. Rubber coat (fisherman).

The owner is expected to supply hot water, towels, soap, three clean pails, quart measure and two assistants.

The instruments are immersed in a very weak therapogen solution contained in one pail.

Another pail should contain a strong eusol solution for washing the instruments and hands.

The third pail is for clean water at a temperature of 115 degrees F. or above, for making the solutions.

The material used for douching the uterus is a $1\frac{1}{2}$ per cent. Lugol's solution.

> (Multiply the number of ounces of water used by .015, the result expresses in ounces the amount of Lugol's solution to be added to the water to approximate $1\frac{1}{2}$ per cent.)

This solution when injected into the uterus should be slightly above body temperature, if cooler it will cause the animal to strain.

The operator's finger nails should be clipped and filed to perfect smoothness. The hands and instruments should be thoroughly washed in a strong disinfecting solution, then again in clean boiled water, before placing them in the therapogen pail. If a purulent case is treated it is especially necessary that the hands and instruments be thoroughly cleansed before proceeding to the next case.

PHYSICAL EXAMINATION AND HISTORY.

Obtain the history, then make a careful physical examination of the patient. Observe the external genitals closely to detect any traces of a purulent discharge adhering to the genital hairs. Such discharge indicates infectious abortion, or granular vaginitis.

Separate the lips of the vulva and examine the mucous membrane for granulations of granular veneral disease. Cleanse the external genitals, wash the hands in antiseptic solution, then insert the left hand into the vagina to determine the presence and character of any mucous which may be present in the vagina or just in front of the os uteri. If there is a plug of sticky mucous covering the os or such a plug forming the cow may be suspected of being pregnant. If the history and further examination through the rectum confirms this suspicion, the examination should be discontinued and no treatment given. The vagina containing a sticky mucous of gelatin-like appearance is an indication that the cow may be pregnant.

If there are no symptoms of pregnancy the examination should be continued through the rectum to include the uterus with its cornua, fallopian tubes and ovaries, to determine size, elasticity and normality. Special search should be made for ovarian cysts and corpora lutea. Abnormal findings should be carefully noted for future reference.

DOUCHING THE UTERUS.

If the cow has an unhealthy discharge, or the history and examination reveal that she has aborted, the os uteri should be presented for visular examination. Carry the 20″ Knowles uterine forceps into the vagina, protected by the left hand and guided by the thumb and index finger. Fasten the jaw of the forceps to the right side of the os.

Apply gentle traction and bring the os back so as to render it easier to attach the 15″ Knowles uterine forceps to the left side. Using gentle traction on both forceps the os may be drawn backward and into view between the lips of the vulva. If it presents a healthy pink color, free from granulations and congestions, and the mucous membrane is not puckered up in a ridge, it may be considered normal. If it has a dark, dirty, angry appearance, showing granulations and a thickened, edematous condition of the mucous membrane, infectious conditions are indicated. The bacilli of infectious abortion and pus-producing organisms are most often found in the folds and clefts of the os, from which places they are hardest to dislodge.

Having prepared the 1½ per cent. Lugol's solution in the douche bag at a temperature of about 110 degrees F. to 115 degrees F. in winter, the small or medium catheter is carefully passed through the cervical canal in preparation for flushing the uterus. It is sometimes rather difficult to make this passage as the cervical canal does not run a straight course. Do not attempt to exert pressure. The catheter will slip through easily, if directed along the proper channel. Usually the course of the cervical canal is complicated; in many there are three sets of culs-de-sac in which the catheter may enter. These give the catheter a smooth feel. Placing one hand close to the os, using it as fulcrum and directing the end of the catheter across the lumen of the cervical canal, gives a sensation of roughness. This denotes the proper entrance. Make a slight effort to pass the catheter but do not force it. As soon as it passes freely, stop. Further insertion through the cavity of the uterus may cause the instrument to pierce the wall. In its relaxed condition this organ is very susceptible to injury and a little pressure may cause the catheter to puncture it, in which case the douching fluid will be poured into the abdominal cavity.

After the catheter has been successfully passed, open the tube of the douche bag and allow the cool portion of the solution in the tube to escape, until the warmer solution in the douche bag begins to flow out. Then attach the tube to the catheter and elevate the douche bag about four feet above the level of the uterus, allowing the Lugol's solution to flow into the uterus. The flow may be impeded or stopped by mucous collected in the catheter while passing through the cervix. This will necessitate clearing the catheter. A good plan is to have a syringe fitting the outer end of the catheter. Passing a syringe full of warm water through the catheter will clear out the mucous and the flow can be continued from the douche bag. Ordinarily from six to sixteen ounces of the solution will be required to distend the folds of the uterus and fill it to normal capacity without over-distention. In the case of pyometra, a larger quantity will be required. It is necessary that the solution fill the uterine horns as well as the body of the organ.

When the estimated quantity has passed, measures should be taken to determine the extent of distention. Remove the tube from the catheter. If the solution dribbles or escapes slowly, an additional quantity should be introduced. If it leaves the end of the catheter in a solid stream, jetting out about two inches before falling, and appearing as though under pressure, it indicates that the uterus has been properly distended.

Allow the catheter to remain in position for a few minutes for complete drainage. If the return flow diminishes as though being obstructed, insert the hand through the anus a short distance. This will cause expulsive straining and tend to empty the uterus. If the uterus is found in a soft, flabby, relaxed state, it should be massaged through the rectum.

Careful observation should be made of the discharged douching solution to determine the presence of pus, necrotic tissue or other foreign matter.

The os uteri and cervical canal should be carefully examined for indications of inflammation and granulation; and thoroughly treated by swabbing. Use the Bozenwin curved dressing forceps. Fasten a piece of absorbent cotton securely in the jaw of the forceps and bind it there by rotating between thumb and finger. The diameter of the swab when fastened to the forceps should not exceed the outside diameter of the catheter used in douching. Saturate the cotton with pure, full strength Lugol's solution and thoroughly swab the os and cervical canal.

If some of the full strength solution enters the uterus, it will cause no discomfort or harm. But care must be taken to prevent it dropping into the vagina, as this will cause straining and general discomfort. The vaginal mucous membrane will tolerate a solution only one-fourth the strength of that which may be safely used in the uterus. For vaginal use the solution should not be stronger than one-half of one per cent.

As a precautionary measure to prevent the full strength solution irritating the vagina, hold a piece of cotton, of sufficient size, below the os to catch the drippings during the swabbing operation. This same cotton may be used to remove the excess solution after the swabbing has been completed.

Swabbing the cervix will tend to cause relaxation of the part and render catheterization easier at the next treatment. Usually one swabbing is sufficient. If repeated too often the cervix becomes too lax and flaccid.

The entire operation having been completed, the os may be released and the organs allowed to retract to their proper positions.

When removing the forceps, due care must be taken to loosen and release the teeth in the jaws of the forceps from their grip on the os, by rotating the instrument, to prevent lacerations.

Usually, three treatments as described, at intervals of one week, will be sufficient to restore the cow's sexual power and put her in condition to conceive and carry the fetus to full term. In cases of persistent discharging or inflammation, the treatment may be repeated many times and the douching varied by the use of normal salt solution.

It is believed that many supposedly sterile cows are not really sterile. They have conceived, carried the fetus a short time and expelled it unnoticed. Some of these cases are no doubt due to the presence of pus-producing organisms in the uterus, setting up an endometritis, and are readily responsive to treatment. In treating unfruitful cows the operator should bear in mind the probability of a previous abortion having occurred without leaving any definite traces or history of the occurrence.

At calving time the dam should be provided with a clean box stall and ample bedding to absorb the liquid discharges. Immediately after parturition this bedding should be removed and the stall thoroughly disinfected before fresh clean bedding is placed therein. No doubt many cows become infected with pus producing organisms at time of parturition, due to lack of cleanliness.

DISINFECTANTS AND SANITATION.

The genitals of service bulls should be thoroughly cleaned with Lugol's solution, one fourth of one per cent. before and after each service.

Vigorous efforts should be made to destroy the infecting organisms existing in and about the stables and on the bodies of the cattle. For this purpose, Eupad in solution is believed to be effective as a spray for the stables and for use in making the Eusol solution which should be used as a wash for the hind parts of the cows.

Eupad is simply a mixture of chloride of lime and boracic acid in equal parts. Thirty ounces of this mixed powder dissolved in twenty-five gallons of water makes a desirable solution for spraying and washing the stable.

Eusol is made by taking Eupad in the proportion of six drams to one quart of water, shaking it well and allowing this solution to stand about twelve hours. The solution should then be filtered through cotton or filter paper. This forms a strong stock solution to be used as a base for further dilution. One quart of this stock solution added to four quarts of water will give a dilution of proper strength for use as an external wash. The hind parts of the cows should be washed daily with the Eusol solution; and the stables thoroughly sprayed, at least once a month, with the Eupad solution.

SOME RESULTS OF DOUCHING.

HERD A.—During the summer of 1916 this herd of sixty-two cows was removed from an insanitary barn into a new and well equipped building. Thirty-eight members were given the douche treatment, of which twenty-five were known to have aborted. Most of the calves from the herd died from inanition shortly after birth or contracted white scours and died within a few weeks. Since receiving the douche treatment the cows have been producing strong healthy calves.

No.	Treated	Bred	Calved	Abort. Test	Abort. Before Treatment	Bred		Abort. prior to Treatment
18	1-13-16	2- 2-16	11-19-16	N.	12- 2-15	----------	O. K.	A.
18	----------	12-20-16	10- 4-17	N.	----------	----------	O. K.	A.
36	1- 5-16	8-14-16	5-17-17	------	12-28-15	8-23-17	O. K.	A.
27	1- 5-16	2- 2-16	10- 9-16	P.	12- 3-15	----------	O. K.	A.
37	10-13-16	1-11-17	11- 6-17	P.	----------	12-31-17	O. K.	----------
38	1- 5-16	2-23-16	Slaughtered	------	12-18-16	----------	----------	A.
42	1-13-16	5-25-16	3- 9-17	N.	11-14-16	7-19-17	O. K.	A.
45	1-13-16	6-30-16	T. B. reactor	Killed	----------	----------	----------	A.
34	1-13-16	Killed, pericardial and pleuritis adhesions	----------	------	----------	----------	----------	A.
9	3-22-16	4-11-16	1-22-17	------	3-16-16	T. B. Rect.	O. K.	A. Killed
72	7-31-16	9- 5-16	T. B. reactor	Killed	----------	----------	----------	----------
75	7-31-16	----------	T. B. reactor	Killed	----------	----------	----------	----------
13	10-13-16	3-18-17	12- 4-17	P.	----------	----------	O. K.	A.
80	10-13-16	11- 6-16	8-11-17	N.	10-10-16	----------	O. K.	A.
63	11- 3-16	5-16-17	9- 7-17	(A) P.	10-25-16	----------	----------	A.
43	10-13-16	12- 6-16	3-22-17	P.	10-10-16	8-23-17	----------	A.
19	10-20-16	12-24-16	9-15-17	P.	10-14-16	----------	O. K.	A.
53	11-24-16	12-28-16	A. not known	P.	11-18-16	10-29-17	----------	A.
73	12- 1-16	Repeatedly	----------	P.	11-25-16	----------	----------	A.
58	6- 1-17	8- 7-17	----------	P.	2-17-17	----------	O. K.	A.
33	3- 1-17	9-25-17	----------	N.	2-22-17	----------	O. K.	A.
79	3- 8-17	8-18-17	----------	P.	3- 2-17	----------	O. K.	A.
77	4-16-17	9-19-17	----------	N. S.	3-28-17	----------	O. K.	A.
12	7- 6-17	9- 5-17	----------	N.	----------	----------	O. K.	----------
2	4-16-17	9- 2-17	----------	P.	----------	----------	O. K.	A.
64	6- 1-17	6-13-17	----------	N.	10-17-16	----------	O. K.	----------
67	5-25-17	8-25-17	----------	N.	5-11-17	----------	O. K.	A.
68	5-25-17	8-31-17	----------	N.	5- 9-17	----------	O. K.	----------
36	5-25-17	8-23-17	----------	P.	----------	----------	O. K.	A.
14	6- 1-17	Repeatedly	----------	N.	----------	----------	----------	----------
78	6- 1-17	9-21-17	----------	P.	----------	1- 3-18	O. K.	----------
69	6-15-17	9-18-17	----------	P.	6- 7-17	----------	O. K.	A.
3	7- 6-17	11-14-17	----------	P.	Killed	Hurt	----------	----------
70	6-29-17	8-31-17	----------	S.	----------	----------	O. K.	----------
55	7- 6-17	9-19-17	----------	P.	6-26-17	----------	O. K.	A.
22	7-20-17	8-31-17	----------	N.	----------	----------	O. K.	----------
61	7-20-17	Unprofitable	7-10-17	N.	Not bred, to be killed			
111	7-20-17	9- 1-17	----------	------	----------	----------	O. K.	----------

Twenty-six O. K.=68 16/38%.
Four T. B.= 10 20/38%.
Eight failures= 21 2/38%.

HERD B.—This herd was composed of thirty-five pure bred cows, many of which were sterile. The few calves produced were weak and sickly. Twenty-six cows were treated of which twenty-one recovered and produced vigorous healthy calves.

HERD C.—This was a large herd of two hundred cows, of which one hundred and fifty were treated. Many cases of pyometra, endometritis and other disorders of the genital tract were found in this herd.

It was considered remarkable that in most of these cases the uterus was found to contain a large quantity of fetid pus which had collected for a week, ten days or even a month after parturition. It is evident that a cow harboring several quarts or a gallon of pus will not develop her full capacity for milk production. It was after treating these pus cases that attention was directed to the increased milk flow. Records of fifty treated cows, covering milk production before and after treatment, were collected and tabulated. It was noted that douching with Lugol's solution had the most stimulating effect. The use of Eusol solution also caused a marked increase in the milk flow. Normal salt solution showed no apparent effect and the use of a solution of bicarbonate of soda had a tendency to decrease production.

When bi-carbonate of soda was used in the early treatments of endometritis cases, they did not improve as rapidly as those cases in which the treatments were started with Lugol's solution. But when soda was used for the last douching. especially if just before or at the period of estrum, there appeared to be a better chance of the cow becoming pregnant.

EFFECT OF MILK PRODUCTION.

The disclosure of the increased milk production was incidental to the use of the uterine douche treatment for the relief of contagious abortion. Observations of the milk flow, during the periods of treatment, were made to assist in determing whether or not the douche would react unfavorably, in any manner, upon the cow. In conducting experimental work of this nature it is well to remember that "the cure may be worse than the disease." The milk flow, being a good indicator to the sensitivity of a cow to unsual conditions, was carefully noted and compared with the previous records of each individual. From the data gathered, it may be inferred that the uterine douche has a wide scope of usefulness and can be profitably used for uterine disorders other than contagious abortion. It will restore the cow to normal condition in shortest time and lessen the amount of infectious material discharged in the stable.

The following table shows in the first column the stable number of the cows; next the weight of milk produced per week. In some instances the first weight recorded covers a period of less than one week. The succeeding columns show the weekly milk production during the time that the cow was receiving treatment at weekly intervals. The letter indicates the material used in the douching solution. L—Lugol's sol. Bi. C.—bicarbonate of soda; E—Eusol; S—normal salt solution. Thus, is shown the number of weekly douchings, the material used and the influence on milk production.

Summary:

46 cows treated:	26 increased	33 increased
	7 decreased	6 no change
	6 no change	7 decreased
	7 varied	
	46	46

7 cows decreased:	1 check—not treated
	3 sub-lumbar abscess
	2 tuberculosis
	1 cause unknown
	7

239	87.7-L	304.0-O	318.4			
303	99.7	176.2-L	185.4-L	190.8-S		
157	237.4-E	309.4	325.4			
203	81.3-L	210.7-E	236.6-E	252.7	266.7-L	288
*231	84.0-L	89.0-E				
126	205.4-L	280.4-L	296.4-E	316.9-E	316	309
214	249.3-L	342.4-E	368.7-E	397.9-E	393.1-E	378.1-E
299	120.4-L	152.4	147.5-L	147.0-O		
296	37.6-L	160.6-L	199.6-L	197.6		
205	267.8-L	329.6-L	330.3	358.7	352.4	
†190	263.6	251.7	241.9			
294	161.2-L	265.6-L	298.9			
293	137.7-E	221.8	218.6-L			
292	113.7-L	141.3-L	139.1-L	157.8	148.3	150.9
291	173.1-L	260.6	271.6	280.6	292.5	
289	65.5-L	283.2	296.9-L	281.8	293.5	290.4
287	182.7-L	193.9-Bi. C.	194.2-Bi. C.	196.4		
286	243.8-L	276.6-L	266.5	267.8		
285	53.1-E	224.2	254	220.5	226.5	
‡283	20.6	186.0-L	188.6-L	185.4	183.9	181.2
284	199.0-L	261.6-L	276.9-L	293.2		
112	62.7-L	134.4-L	146.3-L	155.1-L	140.9	151.5
‖130	L. Bi. C.	94.6	243.4-Bi. C.	247.8	241.6	263.3
225	27.4-Bi. C.	123.5-Bi. C.	130.4	167	189	
280	209.3-L	204.3-Bi. C.	236.8-L	221.7-L	237.6-L	225.5-E
						224.2-O
¶273	129.1-L	170.9-Bi. C.	150	53.6-L	29.1-L	
267	172.2-L	275.2-L	258.8-Bi. C.			
221	193.8-L	176.8-L	293	290.5		
§149	66.4-L	248.7-L	196.9-Bi. C.	125.4	88.3	100.9
275	190.7-L	229.4-L	230.3-L	268.0-L	270.4-Bi. C.	280.1
263	42.7-L	233.1	224.6-L	229.2		
270	109.0-L	187.7-L	205.9-L	222.9		
268	117.7-L	220.7-L	227.2-Bi. C.	228.5		
197	109.1-L	225.8-L	240.5-Bi. C.	157.8-Bi. C.	179.3	199.9
262	10.0-L	84	80.7	82.3	Heifer "A"	
65	38.0-L	301.5	301.8	274	261	293.9
Pyometra						
108	48.8-L	135.5-L	137.5	148.1-L	161.3-L	158.3-L
				148.0-E	151.8-E	156.8-E
194	100.0-L	275.5-L	271.9-L	288.8-L	271.2	276.4
204	74.6-L	191.6-L	200.5-L	212.5-L	221 0-Bi. C.	209.3
131	118.6-Bi. C.	181.4-L	177.3-L	177.4-L		
**244	Pyometra	139.7	120.4-L	126.1-A	161.7-L	163.9-L
199	97.5	202.9	219.4	226.6-L	187.9-L	
Pyometra	123.2	226.8	233.3-L	250.7-L	270.4-L	263.3
22	265	256.6	263.1	266	261.2	274.0-E
118	32.4	178.3-L	243.9-L	289.7-L	298.0-L	302.2-L
††107	298.6-L	299.7-L	278.5-L	272.2-L	271.2-L	251.2-L
‡‡163	36.0-L	267.9-L	293.5-L	293.8-L	336.2-T. B.	302
181	81.8-L	293.7-L	311.7-L	346.5	365.3-Bi. C.	336.9

239								Plus
303								Plus
157								Plus
203	283.7							Plus
*231								Minus
°126								Plus
214	381.3-S	372.3-S	O.-K.-O					Plus
299								Little change
296								Plus
205								Plus
†190								Minus
294								Plus
293								Minus
292	150.9	141.8	139					Plus
291								Plus
289								Plus
287								Plus
286								Plus
285								Little change
‡283								Plus
284								Plus
112	166.6							Plus
‖130	262.4							Plus
225								Plus
280	232.6-E 236.4	236.2-L 235.5	226.5-E Bad Pyometra	213.1-E		238.5-S		=
¶273								—
267								Plus —
221								Plus
§149	118	123	154.4	174.6	193.6	197	206	Plus minus plus
275	275.1	298.3	295.1					Plus
263								Little change
270								Plus
268								
197	219.3	243.6	161.4					Plus minus plus
262								Little change
65	202.8-Bi. C.	312.9	302.9	312.6		329.6		Plus minus plus
Pyometra								
108	167.6-Bi. C.	173.8-Bi. C.	170.1-L	157.1-E				
	166.7-O	168.3						Plus
194	263.4							Plus
204	200.1	211.9						Plus minus plus
131								Little change
**244	172.7-L	163.1-Bi. C.	Aug. 23	172.6-L				Plus minus plus
199								
Pyometra	264	249.9	265.5	267.3	271	277.2-Bi. C.	239.9	Bred—Plus minus plus
22	262.0-E	267.8-E	278.9-E	270.2-L–O. K.				
118	296.4-O							
††107	249.8-Bi. C.	259.6	254.1	262	257.1	264.4	263.3	

‡‡63	215	--------------------	--------------------	--------------------	--------------------	--------------------
181	--------------------	--------------------	--------------------	--------------------	--------------------	Plus —

46 tabulated.
26 + increased.
7 — diminished.
6 O no change.
2 + +
5 + — + increased, diminished, then increased.
33 increased.
6 no change.
7 diminished.
1 not treated in the diminished class, check.
3 sub-lumbar abscess.
2 tubercular.
1 only due to causes unknown.

Key: "L" means Lugol's solution; "Bi. C.," sodii Bicarb.; "S," Salt; "E," Eusol; "O," No Treatment.

*Two abscesses sub-lumbar, cystic ovaries; killed.
†This animal needed treatment, but left for check.
‡This animal should have had more treatment; used ⅝" C at last treatment.
‖This shows we do not get that rapid rise.
¶Sub-lumbar abscess on autopsy.
§Found abscess in pelvic opened.
**Autopsy 12/14/17, uterus clean, pregnant from 11/10/17 service.
T. B., uterus shows no trace of purulent infection. "Hardenbergb."
††Found swelling in sub-lumbar region at time preceding Bi. C., this gradually disappeared.
‡‡Reacted, not fed, caused lower milk record.

At the present writing, five hundred and eleven cows, in eighty-two herds have been given the uterine douche treatment. Demonstrations have been made to one hundred and eighteen veterinarians. The full results cannot be accurately tabulated as the treated cows are widely scattered. Basing an opinion upon the results obtained in the herds under constant supervision, it is estimated that this treatment has been successful in approximately seventy-five per cent. of the cases. Of the apparent failures, about ten per cent. were sold because they were unprofitable in the dairy; but when slaughtered some were found to be pregnant. About five per cent. proved to be tuberculous and ten per cent. were unaccountable failures.